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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/582,931

06/14/2006

Hideyuki Kobayashi

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EXAMINER

GLASS, ERICK DAVID

ART UNIT

PAPER NUMBER

2837

MAIL DATE

DELIVERY MODE

12/18/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/582,931	<b>Applicant(s)</b> KOBAYASHI ET AL.	
	<b>Examiner</b> Erick Glass	<b>Art Unit</b> 2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-8 is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/14/06, 10/16/07</u> .                                       | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Wada et al (US 5,404,960).

With respect to claim 1, Wada teaches an electric power steering device (abstract) for controlling the output of a motor (fig. 1, 3) that applies an auxiliary steering force to the steering mechanism from a current reference value calculated based (column 8, lines 29-53) on at least steering torque signal generated in a steering shaft, said device comprising: a duty ratio calculator (fig. 1, 76) for calculating a duty ratio D1 (fig. 1, P1) and a duty ratio D2 (fig. 1, P2) determined by the motor terminal voltage based on said current reference value; and a motor drive circuit (fig. 1, 77) including a motor connected across the output terminals and a power supply connected across the input terminals of an H bridge circuit (fig. 1, Q1-Q4) made up of a first arm and a second arm each containing a pair of semiconductor devices connected in series, a PWM signal for duty ratio D1 driving (column 7, lines 36-57) said semiconductor device in the upper stage of said first arm, and a PWM signal for a duty ratio D2 driving said semiconductor device in the lower stage of said second arm of said H bridge circuit, wherein said duty

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ratio calculator calculates said duty ratio D1 and said duty ratio D2 having a continuous characteristics between the motor current and duty ratio D from said current reference value based on a specified calculation formula (fig. 4; s4, s6, s7, s8, s11 and s12).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wada et al (US 5,404,960).

With respect to claim 2, Wada teaches wherein said duty ratio calculator calculates (fig. 1, 72) said duty ratio D1 and said duty ratio D2 separately (column 7, lines 34-40) to have a continuous characteristics (column 8, lines 48-61) between the motor current and the duty ratio D. Wada does not teach the calculation based on back electromotive force of the motor. It would have been obvious to one of ordinary skill in the art to apply the technique of using bemf incorporated into the duty ratio conversions. Using bemf is a known technique to obtain position, speed, and current from the motor, which is recognized as ordinary capabilities of one skilled in the art.

### ***Allowable Subject Matter***

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The following is an examiner's statement of reasons for allowance: With respect to claim 3, the Prior Art does not teach an electric power steering device, a duty ratio calculator, a motor drive circuit, wherein, when the following condition is satisfied for the absolute voltage of the motor terminal voltage command value  $V_{ref}$  and the absolute value of the motor back electromotive force  $K_t w$ :

$$|V_{ref}| < |K_t w| \dots\dots(c)$$

then said duty ratio calculator calculates said duty ratio  $D1$  from the following formula (a), and said duty ratio  $D2$  from the following formula (b):

$$D1 = V_{reg}/V_r \dots\dots(a)$$

$$D2 = \{V_{ref2} + \text{sign}(V_{ref2}) (V_r - |K_t w|)\}/V_r \dots\dots(b)$$

Here,  $V_{ref}$ : motor terminal voltage command value

$V_{ref2}$ : linear motor terminal voltage command value

$$= 1/2 (V_{ref} - K_t w)$$

$V_r$ : Voltage supplied to motor H bridge (battery voltage)

$K_t$ : = Motor back electromotive force constant

$w$ : Motor angular velocity

$\text{sign}(V_{ref2})$ : reference symbol for linear motor terminal voltage command value  $V_{ref2}$ .

Claims 3-8 are allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

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accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick Glass whose telephone number is (571)272-8395. The examiner can normally be reached on 9-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Benson can be reached on 571-272-2227. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Erick Glass/

Examiner, Art Unit 2837

/Donovan Lincoln/

Supervisory Patent Examiner, Art Unit 2816

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